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Contract Manufacturing

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Contract Manufacturing

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Abstract

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by

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By surveying literature on the topics of contract manufacturing, this report describes how organizations can make use of contract manufacturing to enhance their profitability and competitiveness. This paper is intended to serve as a guide for organization executives, managers, and team members who are exploring contract manufacturing. It is a how-to manual, and addresses various issues involved in the contract manufacturing, and suggests a methodology for addressing them. Finally, the report briefly describes the perceived benefits of contract manufacturing, but lack of understanding of the total costs involved in executing this initiative may adversely affect many organizations. Thus, the question arises how company decides if contract manufacturing is the right decision, and if yes, then how they perform it effectively and efficiently?

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Executive Summary

The main purpose of this paper is to understand public-sector contract manufacturing in the US, to examine the linkage between contract manufacturing and the use of evaluation methodologies, and to identify issues that are critical to evaluating and managing contract manufacturing in public-sector organizations.

This paper will both provide a comprehensive description of current and past sector trends in contract manufacturing, and describe the challenges it poses to organizations before and after implementation of this new initiation. Several key issues for contract manufacturing will be identified in this study, like problems in evaluating, planning, and managing contract manufacturing, and human resource management during the transition phase.

Proven methodologies, developed by Greaver, and a model by Favreau are suggested, with emphasis on how organizations can utilize them in the decision making process of choosing contract manufacturing, and then how to manage this initiation by following seven successful steps.

These methodologies suggested will reveal how organizations need to fully understand and apply the contract manufacturing investment evaluation and benefits realization processes in order to implement changes carefully and assess their in-house capabilities prior to implementation of this venture. The methodologies are also useful when a company is already in a contract manufacturing phase.

Dell Computers will be used as a case-study to show the importance of contract manufacturing investment evaluation of benefits and risk assessment. Mistakes will be revealed in the Dell's transition from utilizing its own factories for computer building to outsourcing the labor to Foxconn Company. A thorough assessment of the transition process, using Greaver's methodology, will uncover where mistakes were made that negatively affected Dell and how they could have been prevented. Then the methodology will be applied to Dell's current situation, revealing its usefulness for making improvements even after contract manufacturing outsourcing implementation.

Finally, a few recommendations are then given to resolve the contract manufacturing issues that are impacting Dell and its employees, a model of the kind of US organization that is the backbone of our great nation.

Introduction

Proper methodology must be followed when determining cost benefit analysis of contract manufacturing

Multinational corporations are utilizing contract manufacturing to drive down the cost of production through economies of scale. This allows hiring organizations to obtain the needed parts or products without needing to own or operate a factory. However, this results in allowing corporations to transfer jobs to countries where workers earn low wages and have few or no protections at all. Contract Manufacturing is not something that can be considered overnight. It has become a major factor in today's competitive world to utilize advanced technology by using cheap labor. Managers in all organizations must now seek to achieve maximum competitiveness and performance improvements in all parts of business functions.

Contract manufacturing is just one possible solution to the competiveness problem, and not necessarily the best option for every company. Therefore, it is important for US organizations to use proper methodology and research prior to committing to Contract manufacturing. Without this research, it is possible that the new endeavor might go wrong, as will be shown in the case of Dell Computers.

Why Proper methodology is an important component in determining the benefit of contract manufacturing

In order to stay ahead in a competitive business environment, organizations have to keep extending their customer base as far as possible or until they achieve a global market. The pressure of competition can be met by continuous expansion and thus by doing it this way it will reduce overall cost and increase revenue on global scale. "Competitiveness will normally involve some mixture of quality, continuous service improvement, speed of performance and cost reduction" (Heywood 2001, 11). However, the right amount of mix is dependent upon the type of organization. For manufacturing companies the quality of product and low cost is more important, while for service oriented companies, customer service and speed of performance is more important to stay ahead in the competitive market. However, organizations are focusing merely on one cost cutting exercise in a hope that if they keep on reducing cost then eventually they will capture market share in a global market. Therefore, most of the time executives who are constantly under pressure to bring down costs are making some adverse decisions that sometimes eliminate the core business model. In the US business world, the performance of executives and senior managers are measured on a quarterly basis rather than longer term. Therefore, business executives who are under pressure to cut costs are forced to make decisions that only apply to the current competitive situation and they spend less time on other alternatives.

The theory behind contract manufacturing called "virtual organization" is that

"any function that is not core should be transferred to an external specialist in that function. A number of organizations have recently been created on this principle, i.e. all, or almost all, the functions have been outsourced from day one – leaving behind only the "soul" of the business" (Heywood 2001, 30).

However, most of the organizations following or starting a business in this way would fall too soon because contractors or service providers are providing a service only based on the contract term. Contractors or service providers are not committed to improve their partners' growth or increase market share. Therefore, it is very important for any organization to perform through evaluation prior to contracting any of their core or non-core work to a third party. Usually, there are ranges of business activities that have grown with the organization growth, but sometimes an organization is not capable of handling or providing that service in a way that the customer wants. Then it is better to contract it to a third party who is specializing in this function. However, if the decision of contracting is made merely on the basis of reducing costs or reducing labors without evaluating a long-term affect then it would be disastrous for the organization's growth.

The Greaver methodology and Favreau model: Proven methods used for benefit and risk assessment with contract manufacturing

There are various methods organizations can use to improve the overall performance in all business functions, and eventually the goal of every company comes down to cutting costs. The methodology developed by Greaver and research model by

Favreau will be used in this paper as a suggestion to US based companies who are in process of contract manufacturing or planning for contract manufacturing because it has been proven to be an effective cost-cutter.

Case study analysis will be performed of Dell and Foxconn using the Greaver methodology to determine the cost-cutting benefits and losses of their contract management choices. Dell is the only computer manufacturing company that is still manufacturing their computers in the US, but major cuts in hardware costs by their competitors have forced Dell to move their manufacturing in the cheap labor countries like Brazil, China, Malaysia, and Mexico. However, it is still not enough for the Wall Street analysts. To appease them, Dell has contracted their US based manufacturing to a third party manufacturing company, Foxconn, based out of Taiwan.

Background

a. Theory behind contract manufacturing

There are various reasons and benefits associated with contract manufacturing.

Contract Manufacturing Reasons and Benefits (Greaver 1999, 4-5):

1. **Organizationally Driven Reasons:**
    - Increase capacity to fulfill demand for products, services and technology.
    - Renovate the organization.
    - Drive customer satisfaction and increase shareholder value.
    - Enhance effectiveness by focusing on core activities and outsource non-core activities to the experts that are best in supplying those services.
2. **Improvement-Driven Reasons:**
    - Increase operating performance.
    - Utilize skills, expertise and technologies that are best and cheaper in the market without allocating resources.
    - Risk Management.
    - Acquire top-notch products from providers.
3. **Financially Driven Reasons:**
    - Reduce labors and assets costs.
    - Reduce operation and product costs.
    - Generate cash by freeing up resources.
4. **Revenue-Driven Reasons:**
    - Increase market share by reducing product costs.

- Accelerate growth by utilizing already developed providers capacity, products and supply chain networks.

5. **Cost-Driven Reasons:**
    - Convert fixed costs in to variable costs.
    - Reduce product costs by utilizing provider's low cost structure.
6. **Employee-Driven Reasons:**
    - Give employees a stronger career path
    - Drive focus and energy in developing core competencies.

b. Background and Prevalence of contract manufacturing

Facts: U.S. Companies Begin Outsourcing to China (biggest supplier of manufacturing products)

According to Favreau survey results, US companies started outsourcing to China in 1970 and this trend skyrocketed after 1995. At the same time, the growth of privately owned Chinese firms also hit the roof. A total of 46 companies participated in the research, and 22 of those were American companies that had previously outsourced some aspect of manufacturing to a China based firm, and the remaining 26 were all Chinese firms that were manufacturing goods and shipping them directly to American companies. This shows that more American firms are involved in contract manufacturing and this has been rapidly growing since 1995. "Following 1995, this growth rate is extremely similar to the rate of startup Chinese Companies involved in manufacturing for U.S. companies" (Favreau 2007, 79).

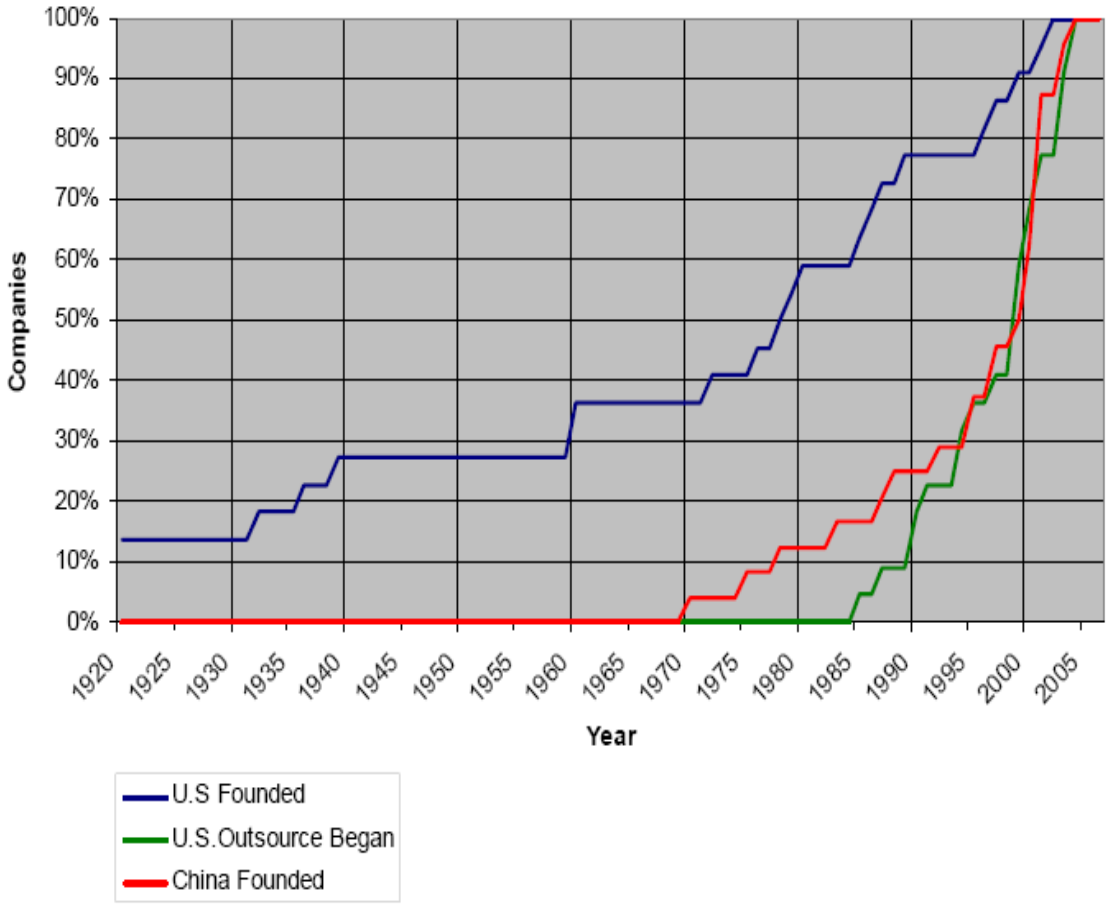

Figure-1 Companies emerge and begin outsourcing (Favreau 2007, 79-80)

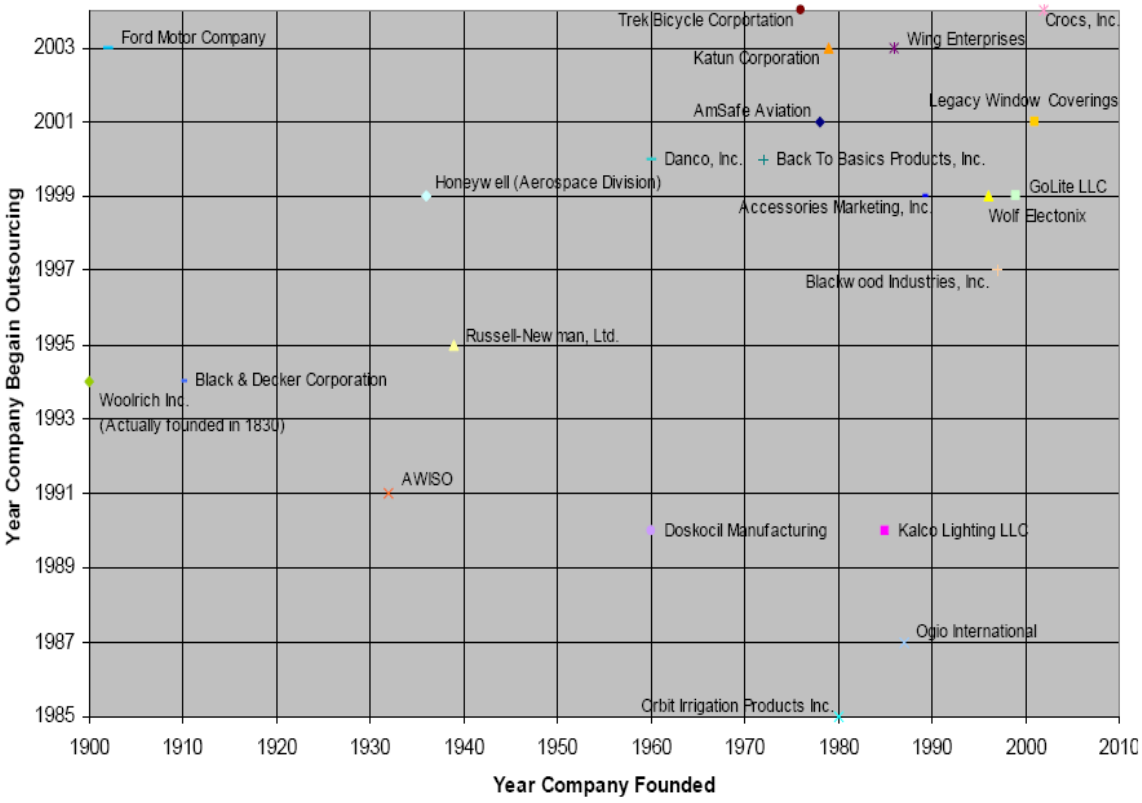

Figure-2 Year U.S. Company founded and Year Company began to outsource to China (Favreau 2007, 81)

According to Figure-2 we can see the year the U.S. companies were founded and the year they started outsourcing. There is no coordination between figure1 and figure 2, but it is shows us how contract manufacturing has rapidly increased from US to China, since 1995. Now in the U.S., medium or large established firms are involved directly or indirectly in contract manufacturing to Chinese and other foreign firms for various benefits. Most are involved for reasons like low cost of raw material, elimination of manufacturing overhead costs, high supply of production workers, low hourly wages, proximity to markets, focus on core business, and increase in revenue. To capture the full

benefits of the contract manufacturing, various analyses are necessary prior to implementation. Numerous success stories of US firms are celebrated by the media and Wall Street when US firms reduce their operating costs by switching to contract manufacturing. However, there is a little or no information available about any US firm that has failed in this phenomenon. As we know this trend has been quite active since 1995 and it is still going upward, so it is better for the organization to use the model described above by Favreau to identify benefits and pitfalls of contract manufacturing. Even if, after evaluating all the factors, an organization decided to go to a third party instead of in-house production, the methodology suggested by Greaver will be helpful to the project team in planning, analyzing, and managing this new initiation.

c. Background of Dell's contract manufacturing partnership with Foxconn

A Case study of Dell Contract Manufacturing (US based PC manufacturing company) with Foxconn (Taiwan base contract manufacturing company operate worldwide):

Dell History of Shutting down factories worldwide to support contract manufacturing:

Dell is well-known for its direct model in which customers can order their customized products either on-line or by calling a sales agent. The Dell factory builds products after they get paid by customers. Therefore, Dell doesn't have to keep a large

inventory. By following this model, Dell became number one in the PC industry by saving huge inventory costs, providing computers cheaper and customizing to the customers. The majority of Dell customers were initially commercial based. However, in 2005, PC sales shifted from commercial to consumer buyers, and this forced Dell to look for other alternatives to reduce the costs of products. Dell entered into the retail PC market, like HP, in early 2007, but that did not help Dell much in beating out competitors. In 2008, Dell decided to contract its manufacturing to Foxconn, a Taiwan based company. Foxconn is the biggest contract electronics manufacturer in the world, and has been manufacturing HP and Apple products. In 2008, Dell decided to follow the same path. So to accomplish this mission Dell decided in 2009 to shut down a factory in Austin, Texas (Dallas News). The Austin facility was where Dell fine-tuned its build-to-order strategy, and this facility played a big role in making Dell the number one computer manufacturer in US. Following the Austin facility, Dell announced that it was closing a desktop manufacturing facility in Lebanon, Tennessee in Jan 2009, where Dell had moved in May 1999 (Statesman). Finally, Dell decided to close down its North Carolina and Ireland facilities at the end of 2009. After moving to Poland from Ireland, Dell decided to sell its Poland facility to Foxconn for an undisclosed amount. The planning of closing these facilities was so quick that Dell didn't anticipate what would happen if Foxconn did not pick up its products!

Foxconn opened factory in San Jeronimo, Mexico to support Dell contract manufacturing:

To support Dell contract manufacturing, Foxconn opened a factory in Juarez, Mexico. However, one of the portions of this factory was burned down by Mexican employees after being forced to work overtime without any compensation (Gizmodo). Soon after, Foxconn opened another factory in San Jeronimo, 30 miles away from Juarez, Mexico. This factory is spread over 1.4 million-square feet in three massive buildings, and employs around 7600 Mexican workers (Elpasoinc). These 3 buildings are totally dedicated to supporting Dell products.

Dell Contract manufacturing planning:

Dell shut down most of its US based factories and diverted resources to bring Foxconn manufacturing up to Dell requirements. However, Dell didn't announce the shutdown of its Austin based Server manufacturing, but it did announce its plan to shutdown desktop factory in North Carolina. Dell has started layoffs in 2008 to support its contract manufacturing mission, but it really ramped up after market crash – even in the server factory, which they haven't transferred yet to Foxconn. Foxconn really picked up production of Dell retail products because they are expert in this type of manufacturing. So at that point it seems like Foxconn is the right choice for Dell. However, before we go further we will study how the Dell and Foxconn factories worked.

Dell Factory layout:

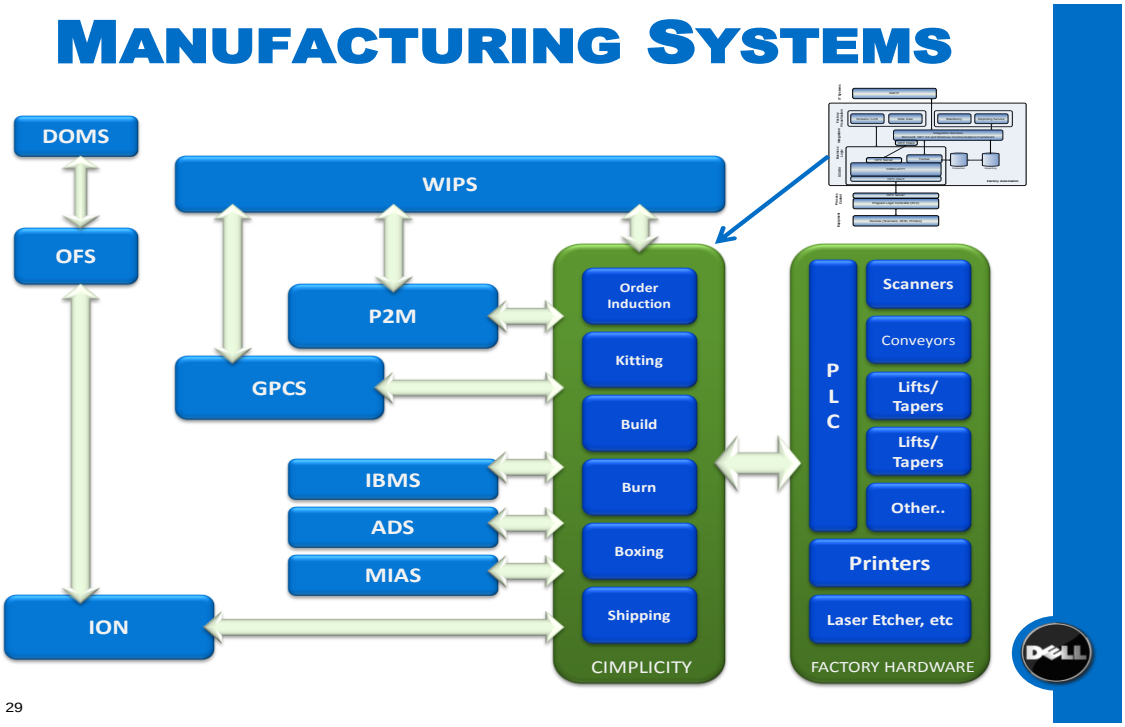

Figure-3 Dell manufacturing & .NET (Hammonds 2007)

We can see from the above figure how smooth and efficient Dell's manufacturing process is and how well it is organized based on lean manufacturing principles. Usually, customer orders are built in 6 hours with excellent quality. Dell factories had more automation in their process and highly organized infrastructure, and this all required huge investments to support their daily functions. Due to this automation and high investment in infrastructure, Dell was able to build customer orders in 6 hours. However, Foxconn factories are not designed to support automation because it requires huge investments, so they are mostly using human power to support daily factory functions.

Mostly all of the Foxconn process is manual and for any production related issues they hire more labors because it is cheaper in Mexico, but as we know numbers don't

makes quality products. Dell's business model is unique because Dell builds computers based on how customers want them, and therefore every order built by Dell is unique and different. On the other hand, Foxconn expertise is in building mass batch products with similar configurations. It will be difficult for Foxconn to build varieties of products because they don't have experience in building customized products, and also they do not have skilled laborers like Dell had. It seems like Dell executives did not anticipate this issue in their planning stage. Dell customers are habituated to getting products at a scheduled date and if they don't get it on time they might ask for huge discounts from Dell, which will directly affect Dell's profitability.

Favreau Model and Greaver Methodology

a. Deriving an Expected Outcome for Contract Manufacturing:

The below research model is very useful for the organization in the decision making process of contract manufacturing. Some of the research factors as described below are expected to provide benefits and other factors are evaluated to determine their potential negative effects.

The figure below depicts how the organization's research criteria of positive or negative value can affect the expected outcome of the contract manufacturing. "The affect of research factors on the expected outcome can generally be categorized into costs and revenues, as shown in below graphical model" (Favreau 2007, 63). Factors shown in the model that provide a benefit or are helpful to the organization's efforts are marked (+) and the factors viewed as potential pitfalls are marked (-). "The evaluation of positive and negative factors produces an expected outcome, which determine, whether or not a company chooses to outsource" (Favreau 2007, 63).

The research model developed by Favreau is very helpful for the organization in the decision-making process to choose "outsourcing or not?" The model is also helpful to evaluate the positive and negative factors of outsourcing, and based on that, the organization can make decisions on tradeoffs.

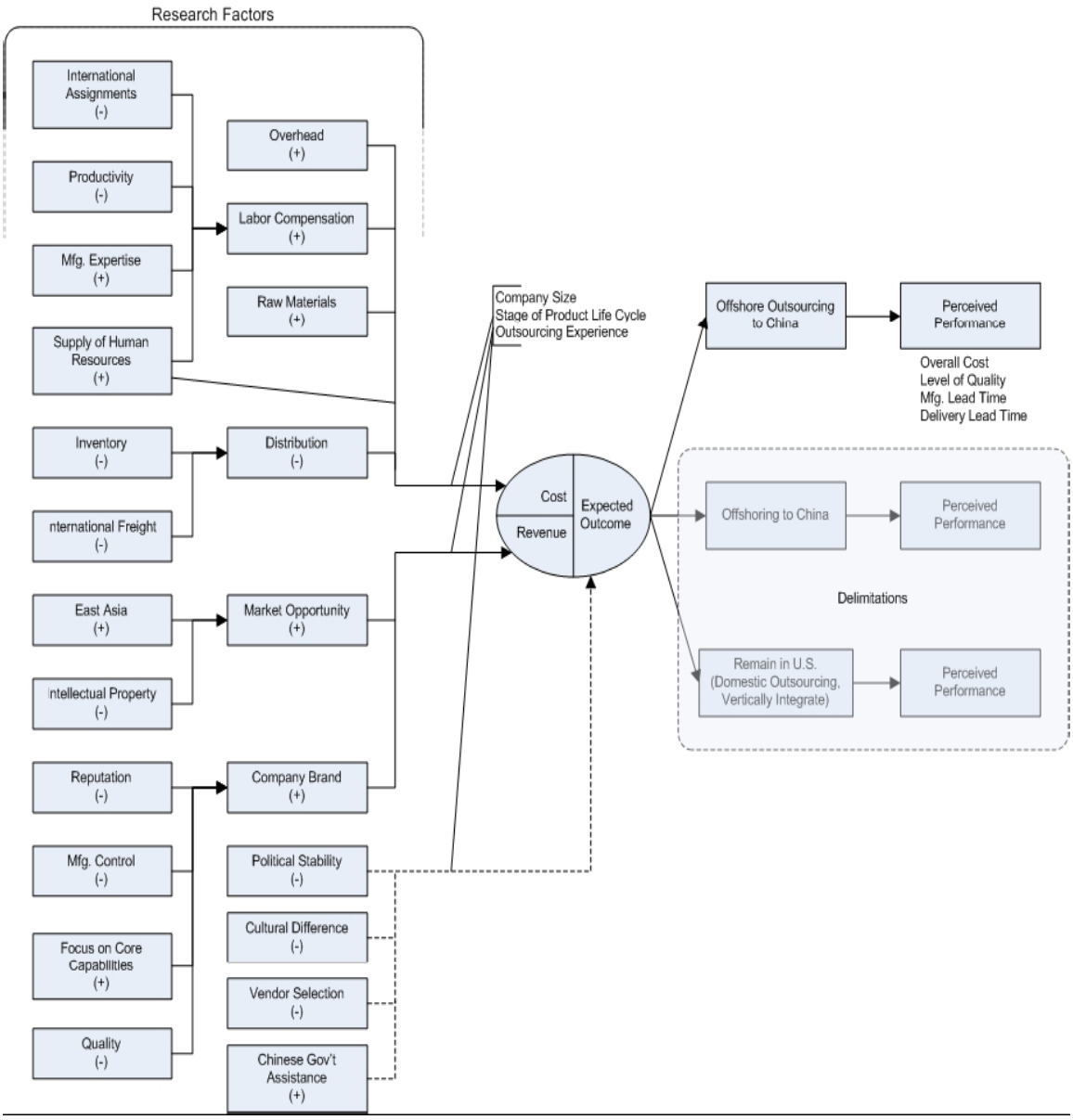

Figure-4 Research model for deriving an expected outcome for outsourcing

(Favreau 2007, 64)

b. Methodology Stages:

The following are the suggested steps to successful contract manufacturing:

1. Planning Initiatives:

In a planning stage, usually cross-functional teams are formed from the various parts of the business functions to study and implement contract manufacturing initiatives. "The project team assesses the risks and the resources, information, and management skills needed to mitigate those risks. Team objectives, deliverables, timetables should be set and management "buy-in" must be achieved" (by Greaver, 24-29). As we know, contract manufacturing or outsourcing involves a number of strategic issues, so it is very important to get senior management involvement and support in all phases. Also, during the planning stage, the organization should involve external advisors like lawyers who are expert in negotiating contracts, CPAs who are expert in analyzing cost-benefit analysis, and the various other experts depending on the situations.

The announcement of the initiation of contract manufacturing to the employees must be planned and should be well executed in a timely manner. Eventually, the information related to the initiation will leak out to the employees and it can adversely affect morale. Some preventive steps are necessary for the organization to take during the planning phase to avoid turmoil among employees, like holding meetings with employees and taking employees out of their normal duties, engaging advisors, and announcing new career opportunities for employees, etc. It is better for the senior executive team to

communicate what parts of the organization they are planning to outsource and the reason behind it, and also, how it might affect employees if the initiation reaches the final stage of decision.

There are other powerful opposing forces like managers and their senior managers who might react against this initiation due to fear of losing power and jobs.

> "As Former U.S. Secretary of State Henry Kissinger once said "Power is the ultimate aphrodisiac". A good rule of thumb is that executives will not outsource their own positions or the positions of those who report directly to them. For executives to seriously consider outsourcing, the area would have to be at least two levels below them. The project team can expect to hear many excuses about why outsourcing will not work." (Greaver 1999, 24-29)

It is also important to clear some of the common questions like how we can expect to reduce costs by contract manufacturing if the provider is going to perform the same activities that we have been doing for years. It's a good argument, but senior team should explain that

> "The provider will apply a superior package of resources, such as on-point core competencies, cutting edge technologies, state of the art equipment, experienced management, and well-trained, motivated personnel. For these reasons, the provider performs better, doing things, faster and more efficiently with fewer resources" (Greaver 1999, 57-58).

2. Exploring Strategic Implications:

Contract Manufacturing or outsourcing can be powerful strategic tools if utilized in an accurate manner.

"To harness its power, however, involves asking fundamental questions regarding outsourcing's relevance to the organization's:

- Vision of its future
- Current and futures structures
- Current and future core competencies
- Current and future costs
- Current and future performance
- Current and future competitive advantages

By exploring the answers to these questions, the project team is better able to understand how outsourcing or contract manufacturing can fit within the organization's strategies, and how its implementation will affect those strategies." (Greaver 1999, 24-29)

For example, if an organization's goal is to reduce operating costs to beat competitors and also have self-driven and team–oriented organizational structure, then contract manufacturing might be a good idea to reduce operating cost. However, it might conflict with the goal of improving worker morale. The idea of contract manufacturing would appear potentially dangerous to current employees. The senior executives have to consider these types of strategic implications, and based on these

types of implications, they have to evaluate the probability of success or failure of contracting work to a third party long before it has actually happened. It is also necessary for the senior executive team to analyze costs thoroughly because often cost-benefit analysts overlook the hidden costs like employees resistance to sharing knowledge with a third party and a reduction in loyalty towards the current organization that can result in poor quality production.

> "Contract manufacturing is a powerful restructuring transformation tool, and the project team should identify it and utilize it to fit with the other transformation tools that may also be used by the organization. Further, any transformation initiative will need to confront issues, such as resistance, cause by change." (Greaver 1999, 24-29)

3. Analyzing Costs and Performance:

Usually, the project team or senior executive team makes financial decisions of making production in-house or buying products from the service providers by comparing the existing costs of the activities to be outsourced with the service providers' proposed costs of those activities. "Unfortunately, most organizations capture costs on a cost element basis (such as salaries, benefits, rents, and depreciation) as opposed to an activity basis" (Greaver 1999, 24-29). It is really important for the assigned project team to conduct activity-based analyses to understand the costs of the activities that might be outsourced and those that are staying, and also they need to consider some of the hidden

costs like invested capital and the estimated costs of poor performance that might happen during transition from both sides due to stressed environments. As we know, a company that is contracting its work to a third party would eventually reduce its work force or sometimes shutdown the whole division, so its employees are not going to perform as needed. On the other end, the contractor's employees are not going to perform as needed because they are in the learning stage that usually takes a long time to learn in order to build any new product as required by the customers.

After gathering activity-based costs for existing activities, it is also necessary for the project team to estimate the future costs of these activities because after shutting down the entire production it is hard for any organization to restart the same activities again. Therefore, it is really necessary for the project team to draw a solid contract with the service provider to control the future costs of outsourced activities. In addition to these, it is also necessary to consider the costs that will disappear due to contract manufacturing, and also new costs that will be incurred for the same reason. These increased costs must be added to provider's final cost proposal. In the end, there are some other activities that are not related to financial benefits but it is very important from the organization's perspective that they be added to help in the "make or buy" decision.

It is very important for the project team to measure the current performance of internal units to set up a baseline so that the financial impact of poor performance can be estimated. Also, by setting up a baseline of current performance, it will help later on to understand how much the service provider performance has improved overtime. Finally,

the project team needs to evaluate the value of assets transferred to the service provider due to contract manufacturing and add this value in the contract (Greaver 1999, 24-29).

4. Selecting provider or contract Manufacturer:

The project team should gather lists of all qualified providers in the market and then rank them based on which one will be the best qualified candidates for their outsourcing work. After ranking all qualified candidates, the qualifications of the each provider are compared with the given criteria and then decision should be made. It is very important to create a competition between providers to get the best deals from them. Finally, Requests for Proposals (RFPs) are prepared by the project team and then delivered to the qualified providers.

"The RFP may include:

- Reasons to outsource
- Outsourcing scope –service applications
- Provider qualifications
- Pricing models preferred
- Performance measures
- Requests for innovative ideas
- Notice of bidders' communication/meetings

When the proposals are returned, they are evaluated and compared to the other proposals and to the organization's expectations (as set forth in the RFP)." (Greaver 1999, 24-29)

This process is a complex and lengthy, due diligence is very important in this stage to examine the qualifications of providers such as:

- Is the provider is ISO certified.
- What types of suppliers providers are using?
- How providers are treating their employees?
- Reference checking from their customers
- Providers factory condition and location
- Any government restriction or environmental violation

Finally, the top providers are selected based on their qualifications fit with organization requirements and then negotiations process can be planned with one or two top providers. Even though the process of analyzing and finding right provider is lengthy, but it is critical for organization's long-term growth.

5. Negotiating Terms:

The negotiation process doesn't begin until final candidates for contract manufacturing are confirmed. Also, the process doesn't begin until some ground rule, strategy and preparation are created by the project or senior executive teams. The negotiations process begins with a discussion on major issues and concerns for both

parties and then ends with converting RPF and the resulting proposal into an informal contract summary.

> "To do this, the parties negotiate the terms and reach final agreement on the major issues. It will include specific terms for the:

- Scope of services
- Factors of production
- Performance standards
- Transition provisions
- Management and control
- Pricing, including for changes in the business scope and volume
- Termination provisions

> The term sheet leads to detailed negotiations, which enables the lawyer to draft a contract document." (Greaver 1999, 24-29)

6. Transitioning Resources :

When the negotiation and selection process is done with the contractor then it is time for transitioning assets and resources. The most complex issues in this process are the handling of human resources. Employees are very sensitive and it is necessary for the organization to handle them with great care because the performance of the remaining employees is dependent upon how the organization treats its current affected employees.

"When in doubt, two words to remember are: overcommunication and overcompensation. These have been valuable employees and they deserve respect" (Greaver 1999, 24-29).

The other factors that are related to production are not that complicated to transfer such as equipment, software, training material, third party agreements, etc. However, sometimes training the employees of service providers is difficult because it requires internal support from the currently affected or no-affected employees.

7. Managing Relationships:

After the transition process is complete, it is time for managing on-going relationships with the provider. During this period, provider's services have already been activated. Now, it is time for closing down the management of production factors and beginning the management of relationships with the provider. Keeping the relationship between both parties strong, depends on how both parties resolve complex issues, share information, evaluate the results, and work together to satisfy end customers. It is necessary to set up periodic meetings and reporting between both parties to evaluate the progress of these new relationships. "This is a partnership of shared commitment. Together it stands (succeeds), while separately it falls (fails)" (Greaver 1999, 24-29).

We know the relationships are managed by people, not by the contract. It is important to test these people when unexpected problems arise or when employees' dissatisfaction emerges. It is a new type of management and manager with special skills required to maintain strong relationships between teams of both parties.

"As the contract approaches its end, the relationship team considers whether to extend it, renegotiate it, or conduct a new competition. The team decides whether to follow the original methodology or a streamlined process for this exercise." (Greaver 1999, 24-29)

c. Risk Assessment:

Whenever an organization decides to bring any new changes like new projects, programs, or services into the organization, then various risk analyses are necessary prior to implementation. Most of the organization believes that risks can be transferred completely to the provider. However, this is not completely true. There are some risks that can be transferred, but not all. For example, if organization contracts its logistics department to provider on a fixed-price that means organization transferred its financial risks to the provider, but what if the services provided by provider to customers are not satisfactory? This can adversely impact the organization's reputation in the market. These types of risks can be reduced by managing the relationship with the providers and also by continuously monitoring providers' performance.

The senior executive team must be very careful to manage the risks associated with any new initiative that can affect the organization's long-term business strategy. Usually, an outside consultant or experts are used during the contract manufacturing initiation process to identify all possible risks and opportunities. Examples of some of the general risks by Greaver:

1. **Risks relating to Contract Manufacturing design phase:**

    - Senior management does not support the proposal.
    - Powerful anti-Contract Manufacturing forces defeat the initiative.
    - Employees' resistance towards outsourcing.
    - Team members are not expert related to contracting manufacturing.
    - The scope is not clearly defined.

2. **Risks Related to Managing the Contract Manufacturing:**

    - The contract manufacturing initiative is not well aligned with the organization's business strategies.
    - A methodology related to contract manufacturing is not executed well.
    - Resources are not provided by organization as needed.
    - Teams related to managing project don't have the necessary expertise.
    - Providers are poorly chosen and not able to provide services as needed.
    - The metrics to measure performance are not properly analyzed.
    - Providers' business or country policy prohibiting the additional analysis or support needed to resolve product related issues.
    - Cost and performance are not available or not analyzed properly.

3. **Risks Relating to the Transition to the Provider's Services:**

    - The project handoff is poorly managed.
    - Employees' resistance towards handing over knowledge or technical skills to the providers' team.
    - Provider is lacking or not has experience of transition process.

4. **Risks Relating to Managing the provider's Services:**

- The provider's is not able to perform as agreed initially.
- Due to providers' lack of technical skills or issues related to production infrastructure causes delayed in customers' product delivery.
- Masking the real issues due to the performance measurement metrics are confusing or not design properly.
- The relationships with provider's team are not improving and causing conflicts.

d. Choosing the Project leader for Contract Manufacturing:

A project leader role in contract manufacturing is very complicated. Numerous activities like managing the project team, getting support from various teams, acquiring resources, facilitating meetings, and dealing with employees' resistance, managing costs and performance, and convincing nonbelievers must be done with limited authority, budget, and resources. In addition to that, dealing with out of reach management expectations within tight deadlines makes the project leader's job very challenging. These types of skills only come with experience, so it is very important to choose a project leader who has previous experience in managing these types of projects.

> "Perhaps the most critical step in the outsourcing initiative is the choice of the project leader. As American entrepreneur H. Ross Perot put it. 'Eagles don't flock, you have to find them one at a time.' While support from senior

management can overcome many obstacles, a weak project leader almost always dooms the outsourcing initiative." (Greaver 1999, 43)

Identifying the right mix of team members is a critical step in a successful contract manufacturing. The project leader can provide significant input in choosing team members. Also, "the provider will bring its best and brightest to the negotiating table. Should the organization put forth any less? Since outsourcing demands time- which is appropriate, given the risks and rewards- the team concept allows the project leader to share the workload" (by Greaver). The Project team members should be chosen based on multiple skills and characteristics like communication skills, self-motivation, creativity, and analysis, as well as the abilities to share the workload, recognize others for their work, and deliver as promised, etc. It is very important to include team members from diverse departments of the internal organization because they are the ones who will manage the long-term relationships between both organizations, and they will also be liable for driving the results.

The allocation of work schedules for team members is very important. At the inception of the project, there will be limited availability of the team members, but as the project moves forward it is very important to move team members to a working schedule that is 100 percent focused on the project. Dividing team focus between both organizations can affect the overall result of the project.

e. Project Management Issues in Contract Manufacturing:

The project scope must be clearly defined to avoid potential problems like:

- If the project objectives are not clearly understood then it could create contradict goals between senior management and project team.
- The project team could try unachievable attempt and waste resources.
- The project team could over analyze the unclear goal and probably never reach to decisive stage.
- The project team might miss very sensitive areas if the instructions are not given clearly.

It is the project leader's job to clearly understand senior management's goals and expectations and then discuss those goals and objectives with the project team. In addition to that, all project management related issues and concerns should be discussed with the project team prior to the initialization of the project. Also, the project team should analyze all given goals and expectations and raise all necessary concerns to the project leader, so if changes are required then the project leader can discuss them with the senior executive team. Some possible concerns are:

- Is management expectation realistic?
- What types of obstacles will the project team be facing? And what resources are required to overcome those obstacles?
- With given environments is it possible to manage the project effectively?
- Is the critical path for the project identified? And is it achievable?
- Is the senior management ready to approve additional budget if necessary?
- Is the organization able to take hit during ramping period?

- What types of performance measures are necessary to evaluate provider performance?
- Is the provider experienced in manufacturing this type of products?
- Are our products a right fit for contract manufacturing or outsourcing, due to high complexity involved in manufacturing those products?
- What types of internal and external restrictions does the provider have?
- Is the senior executive team ready to launch this initiative?

Some of the above concerns are necessary to analyze prior to launching the project. By doing this type of analysis, all will have an understanding of senior management's goals and expectations for the project team.

f. Measuring Operating Performance of Providers:

Performance measures are an important part of Contract Manufacturing. Therefore, the measurement of these metrics are very important to understand how providers fulfilling its contract obligations.

"Examples of these measures include:

- Productivity (inputs ÷ outputs, for example, number of hours ÷ number of widgets made)
- Quality (waste and rework, for example, number or cost of warranty claims)
- Timeliness (meeting deadlines, for example, number of on-time shipments)
- Cycle time (elapsed time from start to finish, for example, number of rings to answer the telephone)

- Utilization (hours worked ÷ standard numbers of hours, for example, number of hours performing a specific activity this week ÷ 40hours)
- Creativity (innovation, for example, numbers of products successfully introduced)
- Outputs (number of items completed, for example, number of characters data entered)" (Greaver 1999, 46)

The project team is responsible for analyzing and monitoring the provider performance and suggesting improvements in a timely manner if the performance is not improving as required. However, provider selection and survival depends on providing superior performance of the products and whether they are highly motivated to do achieve it.

> "The provider motivation is surrounded with a superior package of resources, such as on-point core competencies, cutting edge technologies, state of the art equipment, experienced management and well-trained, motivated personnel. Together, this makes a provider's probability of improving your operating performance in non-core areas very high." (Greaver 1999, 44)

Analysis and application of Greaver model to Dell

Dell Contract manufacturing planning and execution deficiencies by using Methodology:

1. Based on a planning stage model as described earlier, we can assume that the Dell project team missed the key issues to discuss including what type of infrastructure Foxconn is going to use to support their build-to-order strategy? How much IT support does Foxconn have for their manufacturing facilities? And how are they are planning to sustain it for a long time? The announcement of the initiation of contract manufacturing to the Dell employees was not executed in a timely manner, and then massive layoffs terminated lots of experienced employees. The Dell senior executive team announced the closure of many of their own factories without confirming that Foxconn was ready to deliver products as required. Dell always used multiple suppliers for their products and parts. Now a majority of Dell volume depends on Foxconn manufacturing to fulfill the customer demand, and this is not the right business strategy.
2. Dell did make a right choice to go to contract manufacturing. However, their project team didn't anticipate what implications they might face to support product customization and build-to-order strategy. The project team didn't have any back up plan to support US government orders during their planning stage. Though the US government agreed with Dell to purchase their manufacturing products made in Mexico, they want the software images to be downloaded in the US due to security reasons. To support the US government orders, Dell have to keep at least one factory opened in the US, and brings already manufactured products from the Foxconn factory to the US to download the

software images. This is going to add extra shipping costs and overhead costs. However, if later on the US government changes their mind and decides that their orders should also be built in the US then Dell might have to add more overhead in their US factory to support the US government orders.

3. As mentioned earlier regarding analysis and cost performance in the methodology, after gathering activity-based costs for existing activities, it is also necessary for the project team to estimate the future costs of these activities. This is a very important point the project team has to consider prior to initiation of contract manufacturing because after shutting down entire production it is hard for any organization to restart the same activities again. However, Dell has a chance to keep one of the server factories open in the US and make this factory to do multiple tasks, like build all types of desktops and servers, support the US government's demand of downloading software images, and build other complex orders Foxconn cannot handle. Currently, Dell is using this server factory to do all these activities, but my recommendation to the senior executive team is that they shouldn't touch this factory in order to support cost saving criteria. The main important thing to consider is to keep all skilled employees; it is also not useful to keep this factory open when all skilled employees are gone. Therefore, the project team or senior executive team still has a chance to correct their past mistakes by keeping one factory opened in the US, and thereby pressure Foxconn to control their future prices.

4. Though Dell made the right choice on selecting Foxconn as their contract manufacturer, giving them the majority of the products line is not right business strategy. This is one reason why Stan Shinh said "The trend for low-priced computers will last for the coming years. But U.S. computer makers just don't know how to put such products on the market. U.S.

computer brands may disappear over the next 20 years, just like what happened to U.S. television brands." (Nerdtwilight).

Dell has been using Quanta, a Taiwanese ODM firm for their notebook manufacturing, but they never used them as their 100% supplier for their notebook. "Quanta is Dell No. 1 ODM manufacturer, but at the same time, Dell has also established similar relationships with other Taiwanese firms-for example, Compal, Winstron, and Arima. In the year 2002, Dell transferred more orders from its Electronic Manufacturing Service (EMS) in the United States to Taiwanese ODM manufacturers. It is believed, however, that Dell will still keep minimum orders in the hands of its EMS partners. As Fang Guojian, Dell's former Director of Procurement in the Asian Pacific, indicates, Dell's strategy is to adopt the strategy of "check and balance" and its rival partners compete with each other" (Leng 2004, 190). However, it seems like Dell is going against its own policy of putting all the eggs in one basket.

5. The most complex issues when transitioning assets and resources are handling human resources issues. Dell did the right thing in handling human resources when closing down its first desktop factory in Austin, Texas. They gave enough time to employees to find other jobs, and also provided a big severance package to those employees who stayed until the end. However, the closings of other US and Europe based Dell factories were not executed efficiently compared to the Austin based one. However, overall Dell is pretty good in providing employees enough time to find other jobs before closing down their entire operation.
6. After the transition process is done, it is time to manage on-going relationships with the providers. Dell didn't have any experience in managing relationships with contract manufacturers. Dell did involve a separate team to handle ongoing relationships with

Foxconn, but Foxconn has a different culture. We know that managing people from different cultures is not an easy job. Cultural differences play a key role in the multicultural environment. In the Dell-Foxconn case, the Dell project team has to deal with two different types of cultural teams (Taiwan and Mexican). Building trust is the important thing when dealing with different culture teams. Cultural differences in multicultural environments can create misunderstandings between team members before they have had any chance to establish relationships with each other. Thus, building trust is a critical step in creation and development of multicultural teams. There is not enough information available about how the Dell team managed relationships with the Foxconn team. However, Foxconn had a policy that it wouldn't allow any other company's employees in their factory which they later changed for Dell employees.

7. The senior executive team should be very careful to manage the risks associated with any new initiative that can affect an organization's long-term business strategy. The Dell senior executive team didn't anticipate the risks associated with contract manufacturing until they realized that Foxconn was not able to deliver as expected. Due to this reason, Dell has had to delay closing the North Carolina facility two times. In addition to that, the US government requirement that software images should be downloaded in the US forced Dell to keep a Server facility opened until they found any other solution. So it seems like Dell is not able to completely get rid of their manufacturing facilities in the US, and also the Dell senior executives don't know when they will be able to complete this project. In the meantime, Dell has to eat costs of keeping overheads in US facilities.

Why Dell is still not successful in closing all of its Factories in US?

The main reason Dell's efforts in contract manufacturing with Foxconn are not successful is because of Dell's unique way of doing business in the computer industry. To support that unique style, Dell factories were designed to handle all of the complex issues that might arise during the manufacturing process. However, when Dell decided to switch from in-house manufacturing to contract manufacturing, Dell's executive team didn't anticipate the complexity of contract manufacturing. The unique styles made them number one in the US, and also number two in the world. Now, in order to beat competitors, Dell top level management has decided to switch to contract manufacturing. However, the Dell management team didn't emphasize enough that their customers' requirements are more unique than their competitors' customers, and that not fulfilling these requirement would lose money and damage the brand name. Also, Dell customers are paying premium prices for the quality, customization, and on time delivery of their products. If they don't receive their order in the expected time with the expected quality, then Dell has to compensate them to keep their business. These all are the main reasons why the Dell executive team is still struggling in contract manufacturing compared to their competitors, who are best in this type of model. These issues can be fixed but it requires huge investments in the infrastructure and skilled laborers on the Foxconn side, and also continuous support from current Dell support teams. In addition to that, Dell top level management has to suggest to Foxconn to use Dell's proven manufacturing method. Though it will not be easy for Foxconn to accept the Dell model, until a better solution is found, it must. To become

a successful partner, Foxconn has to resolve their current issues otherwise they might end up losing a big contract from Dell.

Why Foxconn is not able to perform as expected even though they are number one contract manufacturer in the world?

The main difference between Dell's direct model and the rest of the industry's regular model is that in a Dell direct model each order built by Dell factories is unique and customized. On the other hand, in a regular model, the usual practice is for the manufacturing company to build a large batch of the same type of product without any major changes in a configuration. This type of manufacturing does not require workers with as many skills. Also, when a huge order gets ready, manufacturing companies either sell a big batch of products to the retailers or to the other middle companies. This type of model is widely used by almost all computer manufacturing companies. Dell is the only unique company that has a different model. Foxconn is the big contract manufacturing company, and builds computer products for many US and non-US companies. However, it was not aware of Dell's unique business model, which is totally different and complex, and now Foxconn is trying hard to make it work.

Recommendations for Dell and Foxconn:

What changes does the Dell executive team need to implement at Foxconn to overcome the current situation? And what changes should Foxconn implement in their factory to ramp up their production?

- Infrastructure changes in Foxconn are possible. However, it requires huge investments from Foxconn side. So it is up to Foxconn executive team to decide, and also how Dell senior executive team will influence the Foxconn executive team to invest in infrastructure for long-term relationships.
- Regarding Section C., #4, "Risks Relating to Managing the provider's Services," Foxconn will not allow any other suppliers in their factory at any cost. It is their trade secret rule and they don't want their competitors to observe their processes or any deficiencies in their layout. However, Foxconn has agreed to include Dell employees to resolve their current manufacturing issues. For other vendors and suppliers Foxconn has agreed to meet them on a neutral location. So, there is one location in Mexico near the Foxconn factory that is reserved by Foxconn to support vendors and suppliers. This is where Dell suppliers can work on any issue encountered in the Foxconn production. At present, in the Dell factory, the same type of set up is located inside the factory; for Foxconn it is set up outside their Factory. I think this is still a better solution than not allowing vendors or suppliers inside their factory at all. Somehow all of these vendors or suppliers are all Foxconn competitors, so it makes sense that Foxconn is showing resistance towards them. By doing it this way they are protecting their deficiencies from being easily visible to their competitors.

- Dell engineers from different support groups should visit the Foxconn factory and observe their processes and suggest improvements. This is one way to improve the transition (see Section C, #3 “Risks relating to the Transition to the Provider’s Services”). Here are a few of the observations and recommendations about the Foxconn team to improve their manufacturing processes:

    1. New product launches in hardware and software are very difficult to accomplish due to lack of support from the Foxconn IT team. There needs to be a recommendation for the Dell IT team to work with the Foxconn IT team to develop a new tool to collect and report detailed failure information as to facilitate root cause and corrective actions. If this is not a feasible solution then the Dell IT team should allow Foxconn to use Dell tools.

    2. Foxconn needs to provide detailed change information along with the products software updated files. They also need to communicate to both Dell and Foxconn engineers about what files have been changed or added and why. Also they need to update their monitoring and collection tools to provide "Roamers (Functional repair people) and EMR (Hardware repair people)" with information needed to prioritize repairs.
    3. Foxconn has implemented some homegrown burn rack (Where systems download software images) monitoring tools but the folks on the floor have very little knowledge of the systems or what to do with the information beyond the very basics. Foxconn factory teams needs to learn how to work the hardware failures. Currently they have regular operators trying to troubleshoot systems instead of specialized EMR technicians at the end of the production lines or in

the burn racks. Poor Priority /Expedite process and current burn rack monitoring tool shows the age of system since it was built but has no visibility into the actual age of the order or number of units in that order. This makes it difficult for the EMR (Electrical Mechanical Repair) teams to prioritize which systems need to be repaired first. The workers roaming the burn racks for identifying the issues have little experience to make clear failure determinations and take appropriate steps. No detailed data collection is taking place to identify true root causes. Everything that is not a hardware failure is classified as FIST (Foxconn term to separate the software related failure). To expedite the Foxconn manufacturing processes these issues need to be addressed. If the Dell management team agrees, then they should send a couple of Dell EMR technicians along with members from the Dell training team to train Foxconn EMR technicians. This could potentially solve most of their systems related issues and it will help them to expedite their cycle time.

- Regarding the concern of Section B. #7, "Managing Relationships," communication is critical and should be done daily to resolve any types of production issues in the daily meeting between Dell and Foxconn teams. However, there was little discussion on how to overcome the issue or what caused the issue by any team members. So, if the agenda between both teams would start with the top daily issues, then follow up with what steps have been taken to resolve it, troubleshooting within Foxconn would be greatly improved. Also, if anybody from Dell support groups have better solutions, this needs to be communicated in the meeting as well. This will help Foxconn team to correct their daily top issues. Also, if either side is interested in getting more detail then it should be done offline or upload solutions on a common share point. However, currently there is no

common pub share or SharePoint set up between either of the teams. Usually, most of the communications between Dell and Foxconn teams are done by email. So, it would be great if there is one common SharePoint established between Foxconn and Dell team members where daily discussions and solutions could be posted by both teams. In addition to that, at least one team member from all vital departments should participate in the daily meeting.

- Regarding Section C., #2, Dell has decided to hand over their manufacturing to Foxconn and it seems like this is not going to change. There is no way factory management teams can solicit their current employees to stay in the factory due to the uncertainty of their future. Anyhow, Dell still has a chance to open up a few positions that will support both Foxconn and Dell for a longtime. It seems like this deal is feasible for many employees who are interested in continuing their career in manufacturing. Furthermore, there is a possibility that Dell might have to keep at least one factory opened in the US to support government requirements for their orders. US government (Army, Navy and other government agencies) will continue to buy Dell products if the software images in their systems (Servers, Desktops or laptops) are installed from any US located factory. Thus, Dell has to keep at least one factory opened in the US to maintain government accounts. Dell might use the Foxconn factory to build US government orders, but the software download has to be done in the US factory. So, it make sense for Dell to keep at least one factory open in the US. Also, by doing it this way, Dell will be ready for any future changes by the US government. For example, a potential change could be having the hardware built in the US along with software image downloads. This would not be possible for Dell if they close down the US factory. Dell can use this leverage point to

provide long-term employment opportunities in the factory. This might help Dell keep key important employees to support this transition.

- Dell has revolutionized the PC industry by deploying the "Dell Direct" model. This model eliminates the "middleman" retailers in the PC supply chain and achieved the Number one market share in the PC market by successful management of its supply chain. However, Foxconn is struggling to fulfill their commitments or maintain inventories. At Foxconn there are piles and piles of empty chassis that are sitting because of canceled orders by customers due to late delivery, etc. There are also production issues due to shortages of parts or functional failures that were not able to be resolved. The main reason behind this issue is the lack of having proper tracking tools and not having expeditor teams. Foxconn really needs a solid tracking tool that will show customers order entry dates and their status in the production as well as delivery dates. By having information handy, Foxconn expeditor team can track all orders that are near their ship dates and assign or involve the proper teams if those orders get stuck in production. This solution is not easy to install because it requires support from multiple teams including IT, inventory, engineering and production support.

The above listed recommended solutions are required to resolve most of the Foxconn manufacturing issues. However, there are some solutions that are easy to install as described above and some others require buy-in from both Dell and Foxconn management teams. Also, current members of various departments of Dell are trying hard to bring Foxconn up to speed. As we know, this takes great deals of hard work and commitment to develop a solid process. By tackling big issues first Foxconn might be able to perform at a level that is expected by Dell.

Conclusion

The above-mentioned case studies indicate that contract manufacturing is not a panacea, and careful attention and evaluation is needed to ensure organizational success. There are several important factors that govern successful and less successful contract manufacturing decisions.

It is important for the organization that is considering going to contract manufacturing to perform an in-house capability assessment. There is no benefit for an organization to go to contract manufacturing if its in-house capability is better or nearly equivalent to that of the provider. Pre-project analysis is necessary by using the Favreau Model to determine if in-house manufacturing is feasible and whether contracting manufacturing will negatively impact the performance of the organization. Once the decision has been made to do contract manufacturing with a third party, then the methodology suggested by Greaver should also be adopted immediately in order to manage, evaluate, and realize the expected benefits arising from the pre-project justification and assessment processes. Some limitations in this research have to be acknowledged. While there has been much research on how to do contract manufacturing, there are limited resources available on the real benefits and aftermath of contract manufacturing. Usually, organizations are unwilling to accept publicly that their performance has been negatively affected by contract manufacturing. Therefore, it is necessary for the organization to do due diligence and use the suggested model and methodology prior to implement these changes in their operation. Using the Dell case

study, some key issues have been revealed and the recommendations for dealing with them may be helpful to practitioners and researchers in this field.

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